Table 12.1 – Renewable Energy Impacts Calculation

Conversion Formula:

Step 1 *Capacity (A) x Capacity Factor (B) x Annual Hours (C) = Annual Electricity Generation (D)*

Step 2 *Annual Electricity Generation (D) x Competing Heat Rate (E) = Annual Output (F)*

Step 3 *Annual Output (F) x Emissions Coefficient (G) = Annual Emissions Displaced (H)*

Technology	**Wind**	**Geothermal**	**Biomass**	**Hydropower**	**PV**	**Solar Thermal**
(A) Capacity (kW)	8,181,033	2,189,957	6,417,795	79,103,834	168,977	440,800
(B) Capacity Factor (%)	36.0%	90.0%	80.0%	44.2%	22.5%	24.40%
(C) Annual Hours	8,760	8,760	8,760	8,760	8,760	8,760
(D) Annual Electricity Generation (kWh)	25,799,706,093	17,265,620,227	44,975,908,630	306,239,675,812	333,053,696	705,355,200
(E) Competing Heat Rate (Btu/kWh)	10,107	10,107	10,107	10,107	10,107	10,107
(F) Annual Output (Trillion Btu)	261	175	455	3,095	3	7
(G) Carbon Coefficient (MMTCB/Trillion Btu)	0.01783	0.01783	0.01783	0.01783	0.01783	0.01783
(H) Annual Carbon Displaced (MMTC)	4.649	3.111	8.105	55.187	0.060	0.128

Sources: Capacity: EIA, *Annual Energy Outlook 2005,* DOE/EIA-0383 (2005) (Washington, D.C., February 2005), Table A16, 2005.
Capacity factors: Hydropower calculated from EIA, *Annual Energy Outlook 2005,* DOE/EIA-0383 (2005) (Washington, D.C., February 2005), Table A16. All others based on DOE, *Renewable Energy Technology Characterizations*, EPRI TR-109496, 1997, and program data.

Heat Rate: EIA, *Annual Energy Review 2003*, DOE/EIA-0384(2003) (Washington, D.C., September 2004), Table A6.

Carbon Coefficient: DOE, GPRA2003 Data Call, Appendix B, page B-16, 2003.

Notes:

Capacity values exclude combined-heat-and-power (CHP) data but include end-use sector (industrial and commercial) non-CHP data.

Competing heat rate from Fossil-Fueled Steam-Electric Plants heat rate.